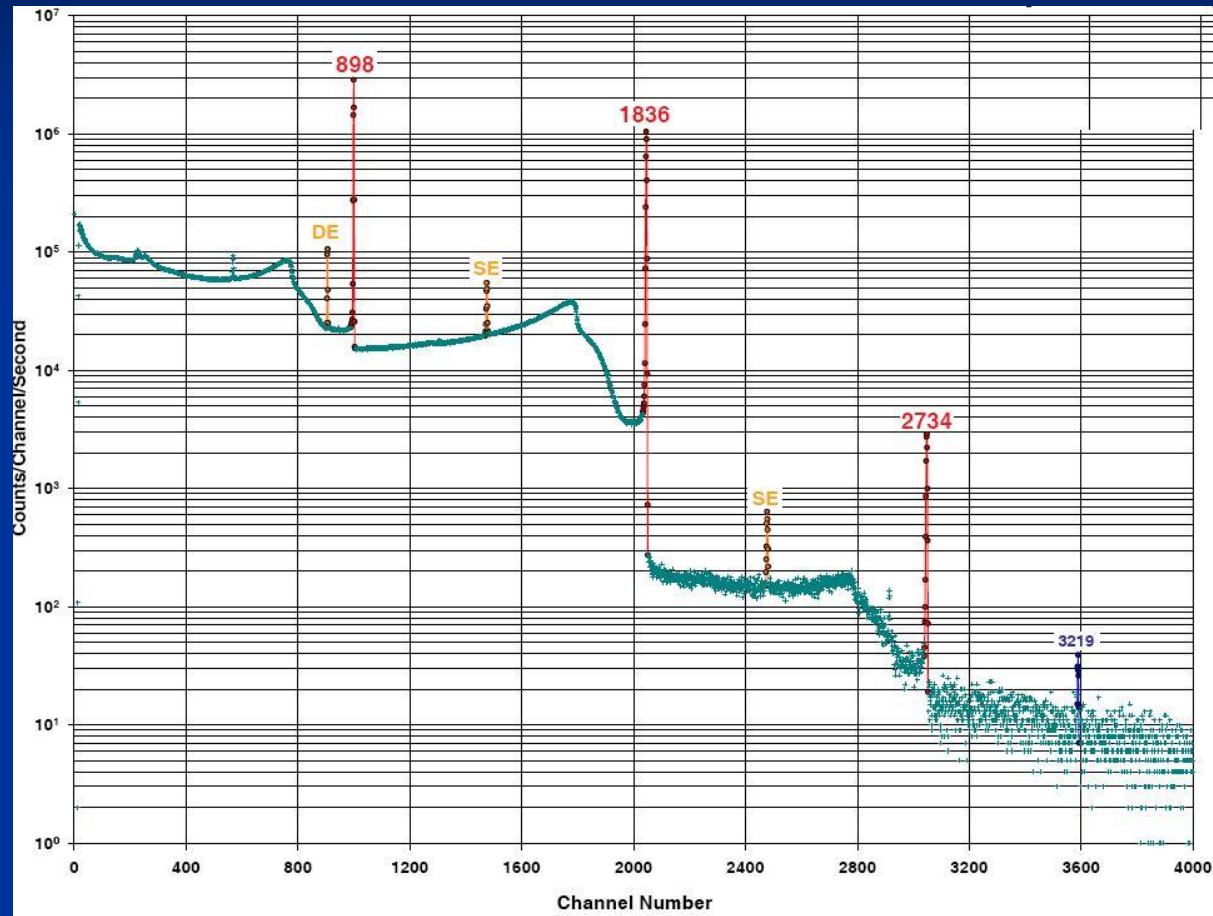



Hands on Exercises: Chart of Nuclides + Nuclear Data

- Find the Cs isotopes which have a half-life in the range 2 weeks -100 years.
- Find the ICRP Dose Coefficients of plutonium isotopes.
- Find the nuclides with gamma lines at 81, 303 and 356 keV with an uncertainty of ± 1 keV.
- How many alpha emitters are known? (Hint: use the Nuclide Explorer, and filter)
- See gamma spectrum on the next page – to which isotope does this correspond?

- See gamma spectrum below – to which isotope does this correspond?



Use Radiation Search in Nuclear Data Retrieval...



Nuclear Data Retrieval

Nucleonica
EGAF Prompt Gammas
Dose Coefficients (ICRP 68 & 72)
8th Table of Isotopes

[Nucleonica quick link](#)

Nuclide Search
Radiation Search
Advanced Search

Radiation Search – Search Variables & Range

☒ **Gamma and X-Rays**

☐ **Alpha**

Energy:

+/- keV
 +/- keV
 +/- keV

Z:

Element:

Mass number:

–

Half-life:

–

Search
Save to my defaults
Reset

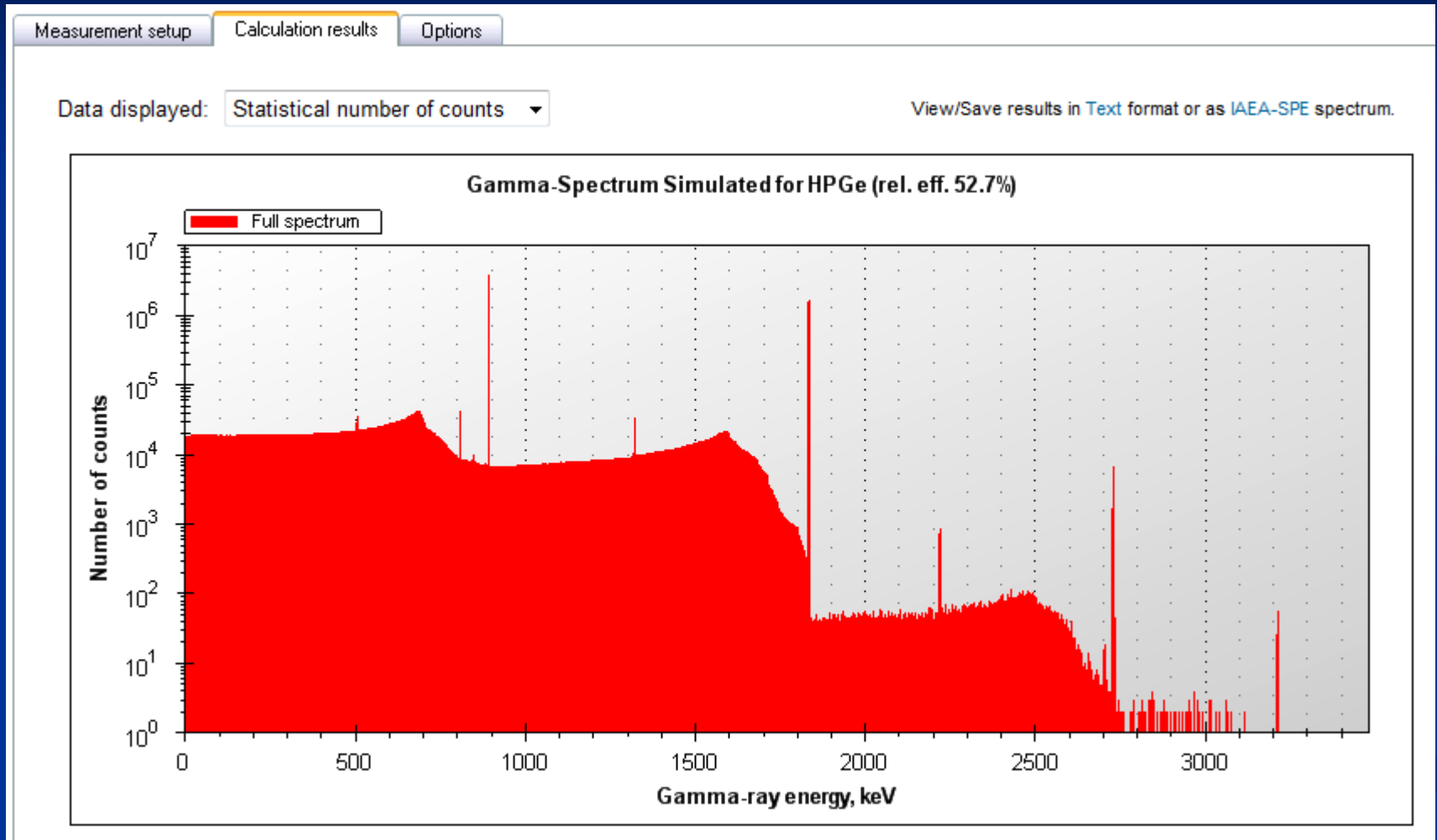
Search returned 6 results
Number of nuclides (ground + isomeric states): 2

Nuclides	Gamma and X-Rays (keV)	Emission Probability
39 Y 88	2734.07	0.00614
37 Rb 88	2734.04	0.0011
39 Y 88	1836.05	0.9932
37 Rb 88	1836.02	0.224
39 Y 88	898.036	0.939
37 Rb 88	898.02	0.147

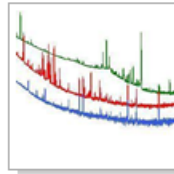
Download

☒ Excel
 ☐ CSV
 Separator:
☒ Use field qualifier (")

Check with Gamma Spectrum Generator, if we can reproduce the spectrum...



Cambio File Converter



Convert a file

Spectrum

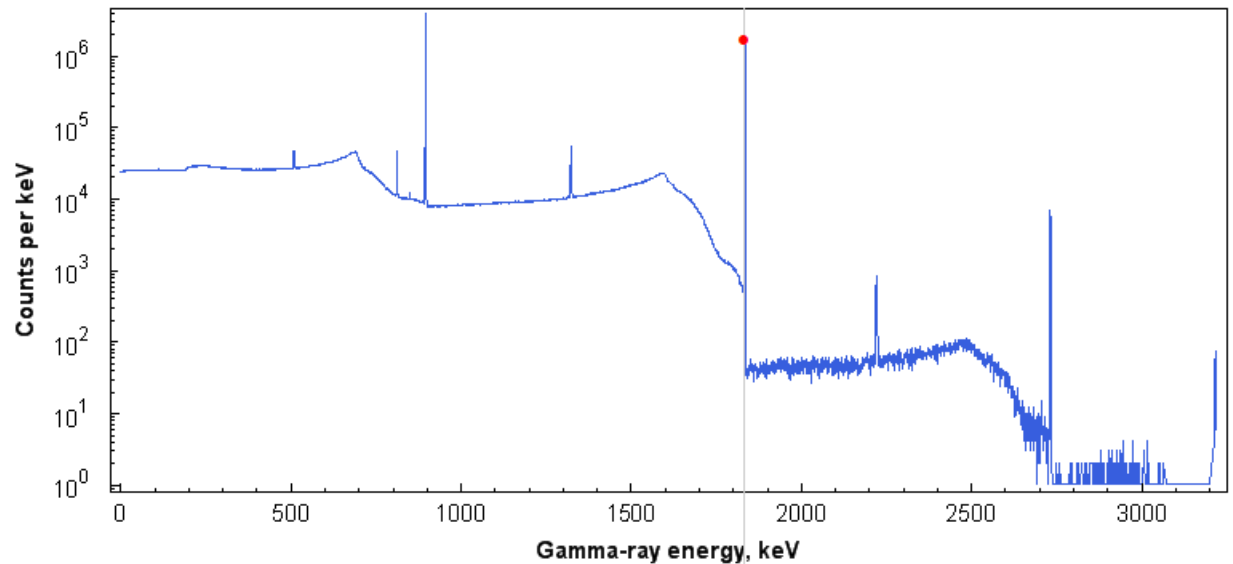
Spectral Data

Sample Spectra

Diagnostics

About Cambio

Spectrum from Y-88 measured: 06.18.2011 04:25:43 (UTC)



Spectral data at cursor position

Energy, keV	Channel	Counts/keV
1836.425	2160	1.70085e+6

Gamma Lines near cursor (from standard.lib, 580 lines)

Nuclide	Decay	Half-life	Energy, keV	Emission Probability (%)
Pa234	β^-	1.17 m	1831.72	1.119E-02
Y 88	EC	106.61 d	1836.07	9.935E01

Show Graph Settings

Print

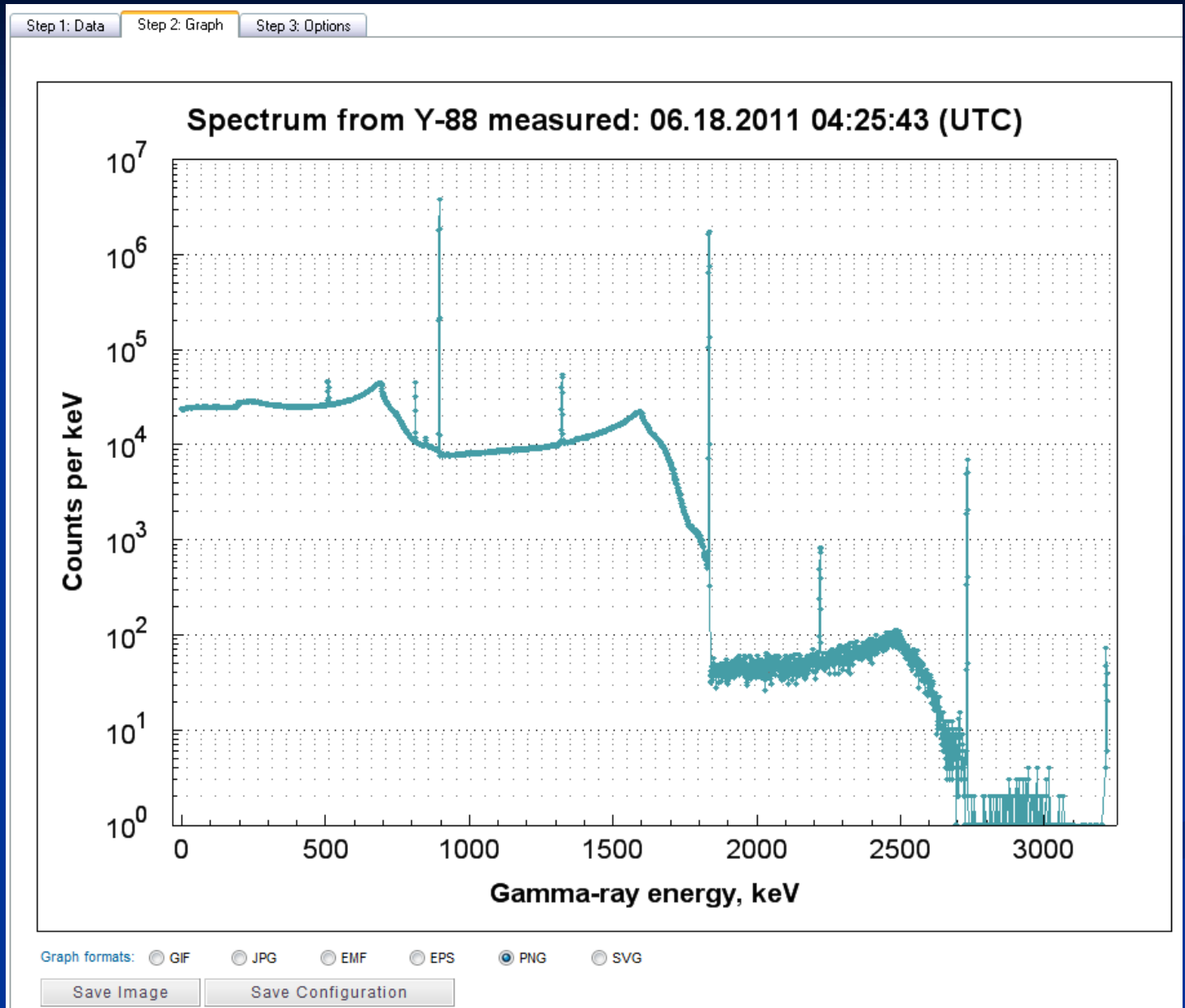
Download

Save Configuration

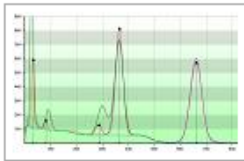
Quick analysis
of the
spectrum with
Cambio.....

Save data as
Iaea.spe (for
later analysis
with Cambio /
WESPA)

Rescale
graphic, change
colours in
[webGraph](#)
.....



Check results with WESPA...



Web-based Gamma Spectrum Analyser - WESPA

Step 1 - Upload spectrum

Step 2 - Select Gamma Library

Step 3 - Measurement setup

Step 4 - Peak analysis

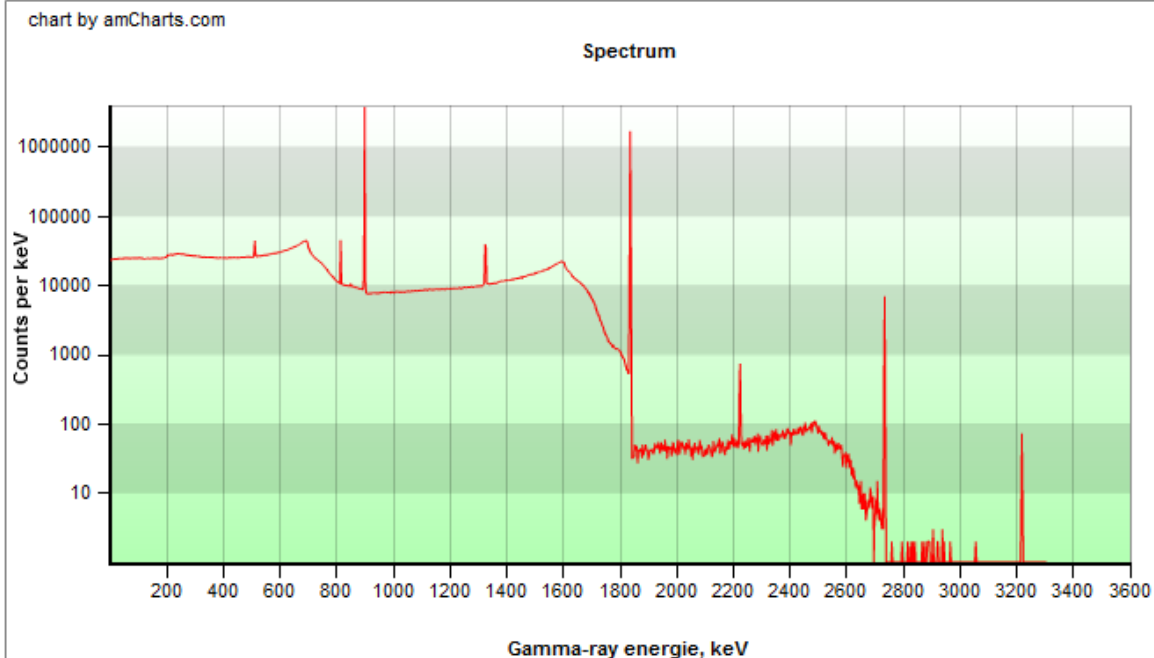
About WESPA

Identify Report

Spectral Data

Input summary

Y-88.spe



Select a Gamma Library for analysis:

- ☐ medical.lib
- ☐ natural.lib
- ☒ standard.lib
- ☐ Upload own library

Durchsuchen...

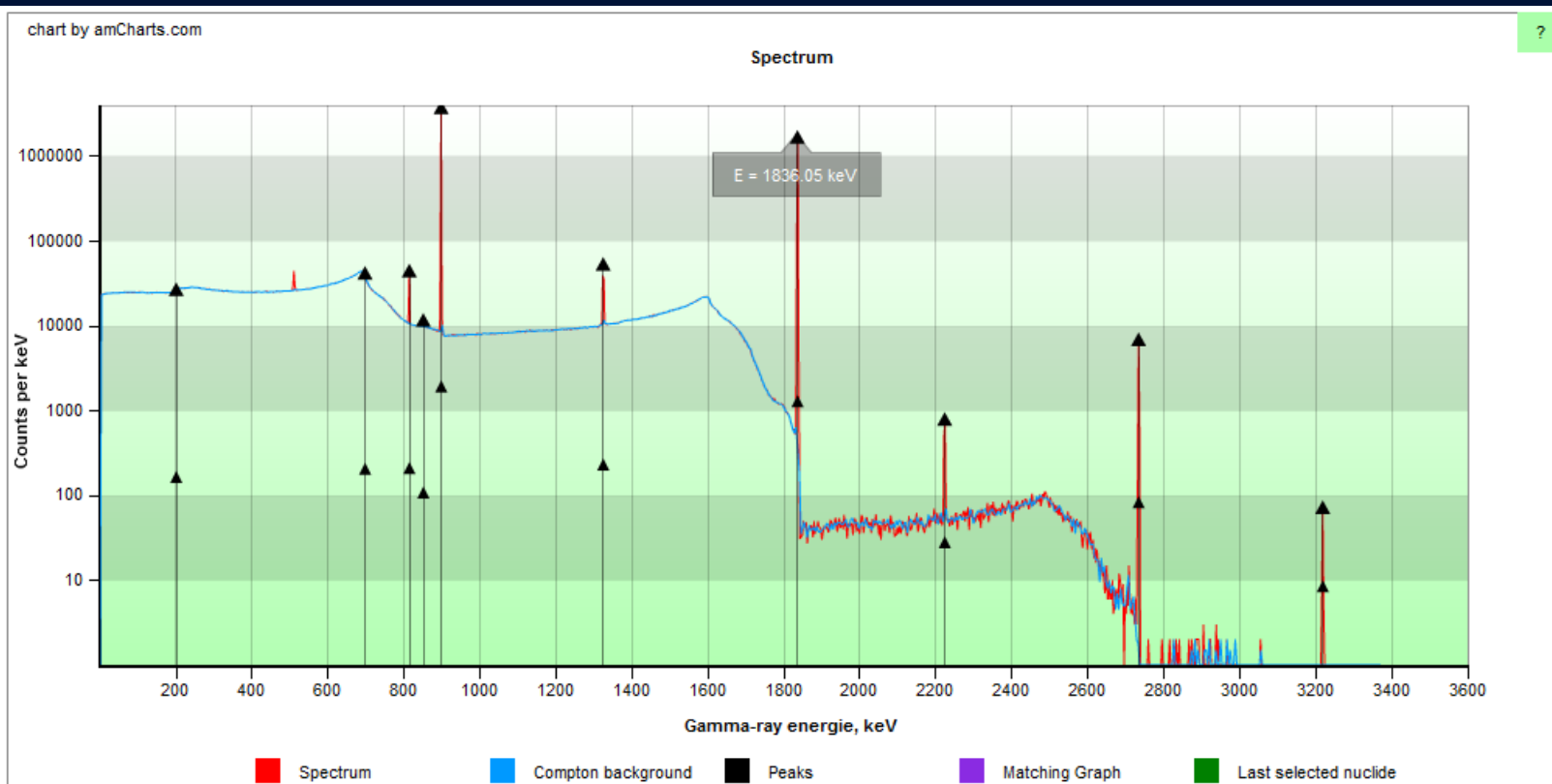
Gamma Library

☒ Logarithmic scale

Next step:

Measurement Setup

Check results with WESPA...

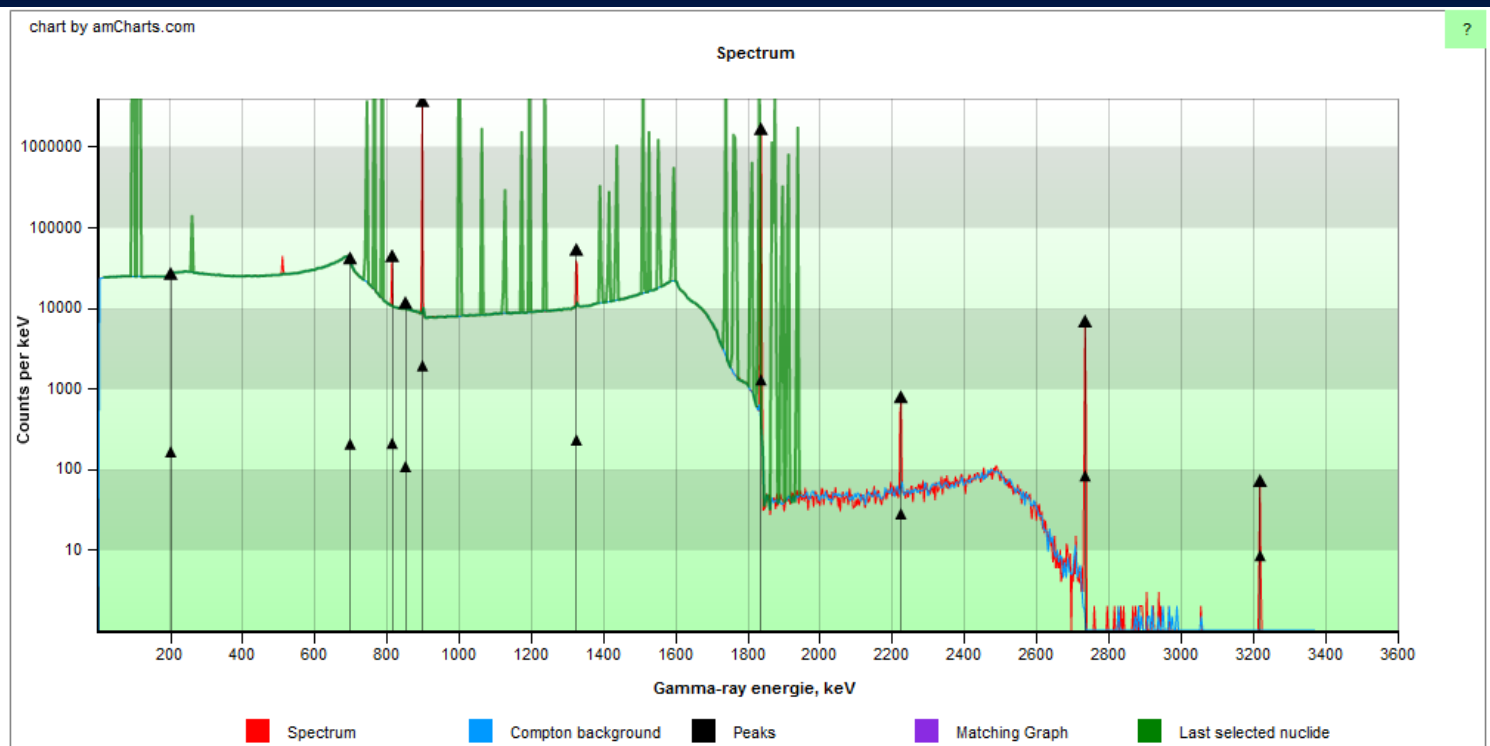


Reset...
 Gamma ray energie, keV: **1836.05**
 Counts:
☒ Logarithmic scale

Detected peaks. Select an energy peak to obtain the list of proposed nuclides				
Energy	Chanel	FWHM	Area	Assigned Nuclide
200.46	235	1.168037	1707.292	
697.17	819	2.754283	10985.33	
814.03	957	1.872874	70110.04	
850.66	1000	1.788244	3901.813	
898.03	1056	1.936442	7804751	
1325	1558	3.449023	161413.5	
1836.05	2160	2.503497	4940322	
2223.02	2614	3.826887	3315.157	
2734.05	3216	2.931367	21494.05	

Nuclide proposal. Select a nuclide and show own spectrum	
Nuclide	Energy from Library
Pa234	1809.15
Pa234	1831.72
Y 88	1836.07
Rh106	1839.02
Bi214	1847.41
Ra226	1847.41
Pa234	1867.97
No selection	

Definitely not Pa-234!



Reset...

Gamma ray energie, keV: 2163.68 Counts: 49.5 ☒ Logarithmic scale

Detected peaks. Select an energy peak to obtain the list of proposed nuclides				
Energy	Chanel	FWHM	Area	Assigned Nuclide
200.46	235	1.168037	1707.292	
697.17	819	2.754283	10985.33	
814.03	957	1.872874	70110.04	
850.66	1000	1.788244	3901.813	
898.03	1056	1.936442	7804751	
1325	1558	3.449023	161413.5	
1836.05	2160	2.503497	4940322	
2223.02	2614	3.826887	3315.157	
2734.05	3216	2.931367	21494.05	
3218.42	3786	3.108194	214.9864	

Nuclide proposal. Select a nuclide and show own spectrum	
Nuclide	Energy from Library
Pa234	1809.15
Pa234	1831.72
Y 88	1836.07
Rh106	1839.02
Bi214	1847.41
Ra226	1847.41
Pa234	1867.97
No selection	

Add nuclide spectrum to the Matching Graph

Y-88 is best fit...

